

PRELIMINARY AMENDMENT
Application Serial No. 09/513,207
Attorney Docket No. 07648.0002-00000

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application. Please amend claims 2-3, 11-12, and 14-24.

Claim 1 (previously presented): A method for simultaneously determining multiple individual chemical concentrations of a liquid kraft liquor stream comprising:

- providing a kraft liquor stream;
- subjecting at least a segment of the stream to ultraviolet light wherein the light penetrates a short distance into the segment and the effective path length of the light is a function of the refractive index of the segment;
- generating an ultraviolet absorption spectrum from the ultraviolet penetration of the sample over a wavelength from 190 to 300 nm; and
- analyzing the ultraviolet absorption spectrum by a regression method to determine the multiple component concentrations of the liquid stream;

wherein the sample is subjected to ultraviolet light by an attenuated total reflectance device.

Claim 2 (currently amended): A method according to claim 1 wherein the attenuated total reflectance device is an ATR-UV optical probe.

Claim 3 (currently amended): A method according to claim 1 wherein the attenuated total reflectance device is an ATR-UV Tunnel tunnel flow cell.

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Claim 4 (original): A method according to claim 1 wherein the regression method is multivariate.

Claim 5 (original): A method according to claim 4 wherein the multivariate regression method is the partial least squares method.

Claim 6 (original): A method according to claim 1 wherein the regression method is linear.

Claim 7 (canceled).

Claim 8 (previously presented): A method according to claim 1 wherein the measured individual chemical concentrations of the kraft liquor are selected from sodium hydroxide, sodium sulfide, and sodium carbonate.

Claim 9 (previously presented): A method for simultaneously determining the sodium hydroxide, sodium sulfide, and sodium carbonate concentrations of a kraft liquor stream comprising:

providing a kraft liquor stream;

generating an ATR-UV absorbency spectrum of the liquor over a wavelength of 190 to 300 nm;

analyzing the ultraviolet absorption spectrum by a regression method to determine the concentrations of sodium hydroxide, sodium sulfide, and sodium carbonate in the kraft liquor stream.

Claim 10 (previously presented): A method according to claim 9, further comprising controlling operation of a kraft cooking digester recausticizing unit, white liquor oxidization reactor or chemical recovery furnace in response to the determined sodium hydroxide, sodium sulfide, and sodium carbonate concentrations.

Claim 11 (currently amended): A system for simultaneously determining multiple individual chemical concentrations of a liquid kraft pulp stream comprising: ~~providing a~~ liquid kraft pulp stream source, an ultraviolet spectrophotometer in cooperative relationship with a device capable of providing ultraviolet absorption data between 190 and 300 nm, and a multivariate or linear calibration program for analyzing the ultraviolet absorption data, wherein the device is an attenuated total reflectance device.

Claim 12 (currently amended): A system according to claim 11 wherein the attenuated total reflectance device is an ~~[[ATR]]~~ ATR-UV optical probe.

Claim 13 (canceled).

Claim 14 (currently amended): A system according to claim 11 wherein the attenuated total reflectance device is an ~~[[ATR]]~~ ATR-UV tunnel flow cell.

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Claim 15 (currently amended): A system according to claim 14 wherein the ~~[[ATR]] ATR-UV~~ tunnel flow cell is installed in the ultraviolet spectrometer and a ~~kraft-liquor stream~~ liquid kraft pulp stream flows through the ~~[[ATR]] ATR-UV~~ tunnel flow cell.

Claim 16 (currently amended): A system for determining chemical concentrations of NaOH and Na₂CO₃ in a kraft liquor stream comprising:

- an ultraviolet spectrometer,
- an attenuated total reflectance device capable of providing ultraviolet absorption data between 190 and 300 nm wherein the attenuated total reflectance device transmits the ultraviolet absorption data to the ultraviolet spectrometer by fiber optic cable, and
- a multivariate or linear calibration program for analyzing the ultraviolet absorption data.

Claim 17 (currently amended): A system according to claim 16 wherein the attenuated total reflectance device is an ~~[[ATR]] ATR-UV~~ optical probe installed in a kraft liquor stream.

Claim 18 (currently amended): A system according to claim 16 wherein the attenuated total reflectance device is an ~~[[ATR]] ATR-UV~~ tunnel flow cell installed in the ultraviolet spectrometer and a kraft liquor stream flows through the ~~[[ATR]] ATR-UV~~ tunnel flow cell.

Claim 19 (currently amended): The system according to claim 18, wherein the ~~[[ATR]]~~ ATR-UV tunnel flow cell comprises a pump and the kraft liquor stream is pumped through the ~~[[ATR]]~~ ATR-UV tunnel flow cell.

Claim 20 (currently amended): The system according to claim 15, wherein the ~~[[ATR]]~~ ATR-UV tunnel flow cell comprises a pump and the ~~kraft liquor stream~~ liquid kraft pulp stream is pumped through the ~~[[ATR]]~~ ATR-UV tunnel flow cell.

Claim 21 (currently amended): The system according to claim 18, further comprising a light source which directs light through the ~~[[ATR]]~~ ATR-UV tunnel flow cell to the ultraviolet spectrometer.

Claim 22 (currently amended): The system according to claim 15, further comprising a light source which directs light through the ~~[[ATR]]~~ ATR-UV tunnel flow cell to the ultraviolet spectrometer.

Claim 23 (currently amended): The system according to claim 18, wherein ~~[[said]]~~ the kraft liquor stream ~~flowing through the ATR tunnel flow cell~~ is undiluted.

Claim 24 (currently amended): The system according to claim 15, wherein ~~[[said]]~~ the kraft liquor stream ~~flowing through the ATR tunnel flow cell~~ is undiluted.